

clones were selected for absence of GFP expression upon activation of the sonic hedgehog pathway. We tested the ability of transfected WT or mutated *GLI2* expression plasmids to restore GFP fluorescence. We concluded that variants *LHX3*:p.Pro187Ser *LHX4*:p.Arg84His, p.Gln100His and p.Trp204Leu and *GLI2*:p.1404Lfs impair activation of the reporter gene, while the *LHX3*:p.Leu220Met and *GLI2*:p.L761P have WT activity on their respective assays. Identification of disease-causing variants in CH is complicated by phenotypic variation, incomplete penetrance, and VUS. Functional testing of potentially pathogenic variants is critical to arrive at a definitive molecular diagnosis. A full catalogue of variant effects in known causative genes would be invaluable for clinicians in order to simplify the interpretation of novel variants and reduce the diagnostic odyssey that families often experience.

Pediatric Endocrinology

PEDIATRIC ENDOCRINOLOGY: ADRENAL, THYROID, AND GENETIC DISORDERS

Prevalence and Risk Factors of Hypothalamic-Pituitary Dysfunction in Infant and Toddler Brain Tumor Survivors

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Background: Childhood brain tumor survivors (CBTS) are at risk for hypothalamic-pituitary (HP) dysfunction, mainly caused by radiation exposure or tumor involvement of the HP-region. The risk for HP dysfunction (HPD) may vary between different age groups due to maturation of the brain and differences in oncologic treatment protocols. The aim of this study was to determine the prevalence and risk factors of HPD in infant (IBTS) and toddler brain tumor survivors (TBTS) compared to older childhood brain tumor survivors (OCBTS).

Patients and Methods: A retrospective analysis in a nationwide cohort of CBTS was performed. Prevalence and

risk factors for HPD were compared between IBTS (aged 0-1 years at diagnosis), TBTS (aged 1-3 years at diagnosis) and OCBTS (aged >3-18 years at diagnosis).

Results: In 718 included CBTS, with a median follow-up time of 7.9 years, overall no differences in percentage of HPD were found between the three age groups. Treatment with radiotherapy (RT) (OR 15.41; 95%CI 8.33 to 28.48), suprasellar tumor location (OR 46.62; 95%CI 19.64 to 110.66) and younger age (OR 1.09; 95%CI 1.02 to 1.15) were associated with HP dysfunction. Because IBTS were significantly less often treated with RT, subanalyses were performed for all CBTS not treated with radiation (n=459). In non-irradiated CBTS, IBTS and TBTS were significantly more frequently diagnosed with TSH-, ACTH- and ADH deficiency, compared to ECBTS. IBTS and TBTS showed significantly more weight gain (p<0.0001) and smaller height SDS (p=0.001) during follow-up.

Conclusion: Infant and toddler brain tumor survivors seem to be more vulnerable to develop HP dysfunction than when compared to older children. These results emphasize the importance of special infant and toddlers brain tumor treatment protocols and endocrine surveillance in children treated for a brain tumor at young age.

Pediatric Endocrinology

PEDIATRIC ENDOCRINOLOGY: ADRENAL, THYROID, AND GENETIC DISORDERS

Prevalence Trends of Metabolic Syndrome Among Korean Children and Adolescents From 2007 to 2018

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Background: The prevalence of metabolic syndrome (MetS) in adults is increasing worldwide. The change of cardiovascular structure associated with metabolic syndrome appears from childhood, it is crucial to detect MetS early, and control associated risk factors to protect future health. **Methods:** We used data of children and adolescents (8,718 subjects aged 10-18) from the National Health and Nutrition Survey IV-VII (KNHANES 2007-2018) to estimate the recent prevalence of MetS, and identify related nutritional factors. The definition of MetS used modified NCEP-ATP III and IDF criteria. **Results:** The prevalence of MetS among Korean adolescents in 2007-2018 was 4.6% using the modified NCEP-ATP III criteria, and the trend of MetS increased significantly (P trend=0.02). In the overweight and obese groups, the risk of MetS increased 7.079 (95% CI, 5.188-9.793) and 27.131 (95% CI, 20.896-35.240) compared to the normal-weight group. During KNHANES IV-VII, overall caloric intake increased, carbohydrate and sodium intake decreased, but fat intake increased (KNHANE-IV; 21.3% to VII; 24.0%, P <0.001). These fat intakes were significantly correlated with an increase in systolic blood pressure, fasting blood glucose, and waist circumference. **Conclusion:** The prevalence of MetS is also increasing in Korean adolescents, and changes in dietary habits are related. In the future, it is also necessary to study the relationship with lifestyle.